UNIVERSITY OF GONDAR

FACULTY OF VETERINARY MEDICINE

STUDY ON PREVALENCE OF INDIGESTIBLE RUMEN AND RETICULUM FOREIGN BODIES IN CATTLE SLAUGHTERED AT BAHIR DAR MUNICIPAL ABATTOIR

DVM THESIS

BY

DESSIE NEBEBE

JUNE, 2015

GONDAR, ETHIOPIA

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A thesis submitted to the Faculty of Veterinary Medicine, University of Gondar, in partial fulfillment of the requirements for the degree of Doctor of Veterinary Medicine

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CSA	Central Statistics Agency
ESSP	Ethiopia Strategy Support Program
FAO	Food and Agricultural Organization
ILRI	International Livestock Research Institute
SPSS	Statistical Package for Social Sciences
TRP	Traumatic Reticulo Pericarditis/peritonitis
χ^2	Chi-Square

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ABSTRACT

A cross sectional study was conducted on cattle slaughtered at Bahir Dar municipal abattoir from November 2014 to April 2015 to determine the prevalence and type of foreign bodies in rumen and reticulum of cattle and to assess the association of risk factors with the occurrence of foreign bodies. Postmortem examination was employed for the recovery of foreign body from rumen and reticulum. A total of 384 cattle were selected using systematic random sampling method and 88 (22.9%) of them were found positive for indigestible foreign bodies in their rumen and/or reticulum. Risk factors such as age, sex, body condition score and breed were taken into consideration. There was statistical significance difference between prevalences recorded in cross (46.5%) and local breeds (22.3%; P<0.05). Statistical significant difference were recorded in old >7 years 66 (29.7%) than adult 4-7 year 22 (13.6%) (p<0.05). Prevalence based on sex was showed that 12.5% in male and 24.4% in female individuals, in body condition score 29.0% poor, 22.1% medium and 15.2% good were recorded. There was higher prevalence in female than male and poor body condition than good and medium body condition score. However, no statistical significance (P > 0.05) was observed for these two variables (sex and body condition score).The occurrence of foreign body were significantly higher (P<0.05) in rumen 57 (64.77%) than in reticulum 21 (23.86%) and in rumen and reticulum 10 (11.36%). The prevalence of foreign body ingestion found in cattle by this study shows that the grazing areas were contaminated with clothes, plastic material, robes, nails and other indigestible materials could pose serious health problem for free grazing animals.

***Keywords**:* Abattoir, Bahir Dar, cattle, foreign body, reticulum, rumen, prevalence

1. INTRODUCTION

Ethiopia is a home for many livestock species and suitable for livestock production and believed to have the largest livestock population in Africa (Solomon *et al*. 2003; Tilahun and Schmidt 2012; CSA 2013). An estimate indicates that the country is a home for about 54 million cattle, 25.5 million sheep and 24.06 million goats. From the total cattle population 98.9% are local breeds and the remaining are hybrid and exotic breeds (Behnke, 2010; CSA, 2013) Despite high livestock population and existing favorable environmental conditions, the current livestock output of the country is little. This is associated with a number of complex and inter-related factors such as inadequate feed nutrition which leads behavior of feeding indigestible materials, widespread diseases, poor genetic potential of local breeds, market problem, inefficiency of livestock development services with respect to credit, extension, marketing and infrastructure (Jabbar *et al*., 2007; Metaferia *et al*., 2011; Negassa *et al*., 2011).

Cattle are compound stomach animals belonging to *Bovidae* family. The ruminant's digestive tract may be more exposed to digestion activities and close relationship with environment such as husbandry management (Kamalzadeh and Rajabbagi, 2008). They are notorious for ingestion of foreign bodies related to nutritional deficiencies and feeding management of the animals. The bovine fore stomach are affected highly due to ingested foreign bodies which are the subject of attention almost all over the world and also major economic importance due to severe loss of production and production ability and sometimes death of the animal (Ramprapbhu *et al*., 2002).

The ingestion and lodgment of foreign bodies are common in the cattle primarily due to indiscriminate feeding habits, do not completely masticate feed before swallowing and does not have highly sensitive prehensile organs such as lips and tongue that discriminate sense of taste. The majority of affected cattle were older than two years of age (Kahn, 2005). In addition, industrialization and mechanization of agriculture have further increased the incidence of foreign bodies in these animals (Semieka, 2010). These are the root causes for various problems in different organs of the animals (Kahn *et al*., 1999). The entry and migration of foreign bodies through the body tissues lead to many complications based on nature of the foreign body entrance into the tissues (Calfee and Manning, 2002). Rumen tympanis and impaction of rumen from the accumulation of foreign bodies, such as plastic bags causes interference with the flow of ingesta

leading to distention of rumen and absence of defecation (Igbokwe *et al*., 2003; Remi *et al*., 2004) are among the most common cause of gastrointestinal disorders in ruminants. TRP is also a sporadic disease in ruminants caused by perforation of the reticulum due to ingestion of foreign materials, which is a common cause of abdominal surgery in cattle (Ghanem, 2010)

Ingestion of foreign body in cattle was reported to be a condition of great economic importance and causes severe loss of production and high mortality rates (Radostits *et al*., 2000). Sharp foreign bodies of the needle and fish hook type may penetrate any part of the digestive tract. These may be lodged in the mouth, the esophagus, the stomach, the intestine, the diaphragm or the pericardium (Shuttleworth and Smyth, 2000). However, if sharp object is known to have reached the stomach safely, the feeding of the cotton-wool to the patient will result in the foreign body becoming entangled in the fibers as in a cocoon, and it may then pass through the canal in safe manner (Jennings, 1994).

Heavy foreign materials (nails, wires) may remain in the reticulum for the life of the animals. If the foreign objects puncture the heart, which is in close proximity to the reticulum, sudden death occurs (Bath *et al*., 1995). Industrialization and mechanization of agriculture have further increased the incidence of foreign bodies in these animals (Misk *et al*., 1994). In Ethiopia, cattle are kept under an extensive type of management and are very likely to be exposed to the ingestion of indigestible garbage of various sources due to a wide spread environmental contamination with plastic bags, absence of policy to protect the environment from such insults and the frequent occurrence of drought that predispose animals to nutritional deficiency and pica (Radostits *et al*., 2000). Therefore, the objective of this study was:

- ✓ To determine the prevalence of rumen and reticulum foreign bodies in cattle slaughtered at Bahir Dar municipal abattoir,
- ✓ To identify the type of common rumen and reticulum foreign bodies,
- ✓ To assess the association of risk factors with the occurrence of foreign bodies.

2. LITERATURE REVIW

2.1. Sources of foreign bodies

When cattle feed green chop, silage, and hay which are collected from fields that contain old rusting fences or balling wire, or when pastures are areas or sites where buildings have recently been constructed, burned or torn down. The grain ration may also be a source due to accidental contamination with metallic objects (Kahn, 2005). Cattle are exposed to foreign bodies due to rapid industrialization, increase in the garbage disposal mostly in plastic bags, more urbanization, higher rise in deficiency of minerals like calcium and phosphorus and other micronutrients in the soil along with the management of animals in towns by letting the animal loose for grazing, insufficient feeding of the animals by the owners, deprived appetite, increase in the number of animals on the existing land space and increase in the construction activity in cities and towns, besides the indiscriminate habit of animals (Misk *et al*., 1994).

Metallic debris is encountered more commonly in processed feeds and forages rather than on pasture. Cattle can also acquire linear foreign material when they are exposed to construction sites or to deteriorating buildings and fences (Howard, 1996). Balling or fencing wire passed through a chaff-cutter, feed chopper or forage harvester is a commonest source. The foreign bodies may be in the roughage or concentrate or may originate on the farm, when repairs made to fences, yards, and in the vicinity of trough (Radostits *et al*., 2007).

2.2. Types of foreign bodies

2.2.1. Metallic foreign body

Cattle are very prone to pick up and swallow metallic foreign bodies of various kinds, including needles, nails staples, wire, umbrella ribs, and pieces of iron. Wires account for approximately 70% of ingested foreign bodies, while nails and steel objects make up other 30% (Fubini and Duchrame, 2004). Remodeling of livestock housing, careless handling of baling wires, pins, feed sack bags and wires, using old buildings sites for hay fields, often occur in female shortly after calving, often occur in male shortly after or during extensive uses for breeding (Schipper, 2000).

2.2.2. Non-metallic foreign body

Some of non-metallic foreign bodies are clothes, robes, clay, plastic and plastic materials, broken glass, paper clip hair ball, indigestible hard pasture and other materials. Stray cattle are generally seen on the road sides eating away the plastic bags and their contents in search of food items. The ingested polythene hinders the process of fermentation and mixing of contents leading to indigestion. They also obstruct the orifice between reticulum and omasum. If not removed though surgery, polythenes may become fatal. The plastic bags cannot be digested or passed as such through faeces by an animal (Singh *et al*., 2005).

The incidence of non-metallic foreign bodies mostly polythene material was explored by various investigators mostly in cattle (Sharma and Pankaj, 2006). The factors that are responsible for higher incidence of non- metabolic foreign bodies are rapid industrialization, increase in the garbage disposal mostly in plastic bags, more urbanization, higher rise in deficiency of minerals like calcium and phosphorus and other micronutrients in the soil along with the management of animals in towns by letting the animal loose for grazing, insufficient feeding of the animals by the owners, deprived appetite, increase in the number of animals on the existing land space etc, increase in the construction activity in cities and towns, besides the indiscriminate habit of animals The absence of recycling industries and increase in the number of units producing the plastics, frequent droughts force the animal to graze down closer to ground leading to increased incidence during the period, inappropriate disposal of wastes by humans, increased pollution of grazing land by plastic of some form at the road point near to highways (Ravindra *et al* 2014).

2.3. Epidemiology

2. 3.1. Occurrence

Foreign bodies may be retained in the body through many mechanisms, including ingestion, placement in bodily orifices, and surgical errors. Cattle are more likely to ingest foreign bodies than small ruminants since they do not use their lips for prehension and more likely to eat a chopped fed (Jones *et al.,* 1997). The majorities of affected cattle are dairy cattle and are older than two years of age (Kahn, 2005). Cattle are inquisitive and tend to consume all sorts of objects while foraging. But small ruminants are selective feeders and ingest significantly less amount of foreign bodies

compared to cattle (Hailat *et al*., 1996). Adult dairy cattle are most commonly affected because of their more frequent exposure (Radostits *et al*., 2007).

Figure 1: Animal consuming plastic bag containing vegetable waste (Ravindra *et al*., 2014)

2.3.2. Risk factors

Anatomic characteristics of cattle mouth plays an important role for ingestion of foreign bodies and other factor in the ethiologies of foreign bodies prevalence is pica and it is a disorder in which animal tend to eat inedible objects. Other risk factors includes remodeling of live stock housing, careless handling of balling wires, pins, feed sack bags and wires, using old buildings, sites for hay fields, often occur in female shortly after calving or often occur in male shortly after or during extensive uses for breeding, field chopper pick up metal (baler), mineral deficiency, pica eating habits and those following pregnancy examination (Karademir and Çitil, 2001)

Rapid industrialization and rapid civilization has resulted in increased incidence of the Foreign Body Syndrome, due to spread of metallic and non-metallic garbage and waste and thus more incidence of these cases are reported in highly industrialized and urbanized areas such as Punjab, Haryana and other big cities (Krishnamurthy *et al*., 1998). Due to intensive system of Livestock rearing for maximal production, high-rise in deficiency state especially of calcium, phosphorus and micro-minerals, has resulted in perverted appetite, which is one important factor for intentional ingestion of foreign objects (Rebhun, 1995). Ingestion of foreign bodies is still extremely common in cattle and buffaloes especially in developing countries where the standard of animal management is unsatisfactory (Misk *et al*., 1994). The condition tends to be more common during drought because animals are grazing closer to the ground or are being fed harvested material that is contaminated with foreign objects, such as short ends of baling wire (Ravindra *et al*., 2014).

The disease is common when green chop, silage, and hay are made from fields that contain old rusting fences or balling wire, or when pastures are on area or sites where buildings are recently constructed, burned or torn down. The grain ration may also be a source due to accidental addition of metal (Kahan, 2005). The disease is much more common in cattle fed on prepared feeds, especially those fed inside for part of the year. It is almost unknown in cattle fed entirely on pasture (Radostits *et al*., 2007). The indiscriminate feeding habits and mineral deficiency make them susceptible to inadvertent ingestion of foreign materials. Industrialization and mechanization of agriculture have further increased the incidence of foreign bodies in these animals (Misk *et al.*, 1994). Cattle kept in close proximity to stable and usual farm steed activities often swallow discarded nails, bits of wire, and similar hard ware (Jones *et al*., 1997).

2.4. Clinical findings

The most common clinical manifestations in cattle are recurrent tympany, complete or partial anorexia, retarded or suspended rumination and sudden reduction in milk yield, stiffness of the fore limbs, displacement of abomasums, reduced dung quantity evacuation, rumen doughy in consistency, dehydration, distended left para lumbar fossa, impacted rumen, constipated faeces in rectum and abducted elbows may be seen (Ravindra,. *et al* 2014). Initially the cow exhibits an arched back, an anxious expression, reluctance to move and an uneasy, careful gait. Forced sudden movements as well as defecating, urinating, lying down, getting up, and stepping over barriers may be accompanied by groaning (Kahn, 2005). Some foreign bodies of metal and other heavy material are quite common in the reticulum of cattle; it is only when a sharp pointed object penetrates the wall of the compartment that signs of discomfort or ill heath are shown (Shuttle worth and Smyth, 2000). Clinical rumen indigestible foreign body impaction will be characterized by pale mucous membrane, complete cessation of rumination, reduced rumen motility, absence of stratification, hard pellet mucous coated dung, and inappetence (Jones *et al*., 1997).

2.5. Pathogenesis

The entrance and migration of foreign bodies through the body tissue leads to many complications that differ according to the nature and the ways of its entrances in to the tissue. Lack of oral discrimination in cattle may lead to ingestion of foreign bodies that would be rejected by other

species. When cattle swallowed foreign body reach the stomach then fall directly into the reticulum or pass into the rumen and are subsequently carried over the rumeno-reticular fold into the cranio-ventral part of the reticulum by ruminal contraction (Gokce *et al.,* 2007. The elevated reticulo-omasal orifice is above the floor, tends to retain heavy objects in the reticulum, and the honey comb-like reticular mucosa traps sharp objects (Kahn, 2005).

The honeycomb-like structure of the reticulum provides many sites for fixation of a foreign body, and contractions of the reticulum may be sufficient to push a sharp foreign body through the wall, inducing the disease. Increased intra abdominal pressure due to advanced gestation, tympany, intussusceptions, sudden fall or accident, parturition, straining, and mounting during estrus increase the likelihood of an initial penetration of the reticulum and may also disrupt adhesion caused by an earlier penetration (Gokce *et al.,* 2007). Mostly non metallic foreign body is accumulating in rumen due to low density and lake of sharpness (Misk *et al*., 1994).

2.6. Diagnosis

2.6.1. History and clinical sign

History and clinical findings of the cow is examined when signs initially appear. Without an accurate history and when the condition has been present for several days or longer, diagnosis is more difficult. Other causes of peritonitis, particularly perforated abomasal ulcers, can be difficult to distinguish from traumatic reticuloperitonitis. Differential diagnoses should include conditions that can produce variable or non specific gasro-intestinal signs like indigestion, lymphosarcoma, or intestinal obstruction. Abomasal displacement or volvulus should be ruled out by simultaneous auscultation and percussion (Ghanem, 2010).

Pleuritis or pericarditis of nontraumatic origin produces signs similar to those associated with foreign body perforation. Tympanic sounds were heard on percussion with simultaneous auscultation of paralumbar fossa. The main diagnostic sign noticed was bilateral sunken flank region with doughy hard impaction of rumen (Turkar *et al*., 2010). Low pitched reticular sounds audible on auscultation at 7^{th} to 8^{th} rib on left side with severe distention in left paralumbar fossa and slight distention in right flank for diagnosis in foreign body associated with plastics in 4 year old crossbred

cow. The rectal palpation is one of themost reliable methods of diagnosing the rumen impaction in cattle (Vijaya and Sasikala, 2012).

2.6.2. Metal detection

Metal detectors were used at one time to aid in the diagnosis of traumatic reticuloperitonitis. Ferrous metallic foreign bodies can be detected with metal detectors. An electronic metallic detector may identify metal object in the reticulum but does not distinguish between perforating and non perforating foreign body (Roman and Hiwot, 2010).

2.6.3. Laparoscopy

Laparoscopic surgery is a modern surgical technique in which operations are performed far from their location through small incisions (usually 0.5–1.5 cm) elsewhere in the body. There are a number of advantages to the patient with laparoscopic surgery versus the more common, open procedure. Pain and hemorrhaging are reduced due to smaller incisions and recovery times are shorter (Ghanem, 2010). The key element in laparoscopic surgery is the use of a laparoscope, a long fiber optic cable system which allows viewing of the affected area by snaking the cable from a more distant, but more easily accessible location. Laparoscopy in cattle is a promising tool for clinical diagnosis and treatment. The application of this tool during abdominal explorations biopsies allows the avoidance of invasive and useless surgical interventions and even diagnosis and prognosis of certain conditions (Athar *et al*., 2010).

2.6.4. Wither pinch and grunt test

Many gastrointestinal diseases cause abdominal pain in the cattle. Cattle with gasrro-intestinal pain often stand hunched up with their elbows abducted. The withers can be pinched as shown in the above picture (sometimes it requires two hands). A normal cow will flex her back ventrally when her withers are pinched as seen above. A cow who is painful will not flex ventrally. False negatives are common. Common reasons for abdominal pain are hardware, abomasal ulcers, or distention of the small intestine with gas (Seida and Abbadi, 2014). In cattle the test is for traumatic reticuloperitonitis and can be conducted in several ways. The cow may be pinched over the withers by forcibly picking up a fold of skin. This causes a sharp depression of the back and pain resulting in a grunt (Misk *et al*., 1994).

Grunt test is a clinical test in which a positive result is an audible grunt by the subject when lift sharply on a beam of wood held under the sternum behind the elbows. Either by using your fists pushed up with your knee or by using a board with one person on each side lifting the board up; apply pressure to the xiphoid region. If the cow grunts, kicks, or acts uncomfortable, you can assume she is painful. Often, you have to listen over the trachea during the peak of inspiration while simultaneously applying pressure to the xiphoid area to hear a grunt (Hewot, 2008). Physical examination the foreign body syndrome can be diagnosed by palpation on both sides of abdomen and with a stethoscope for evidence of grunt (Roman and Hiwot, 2010). Wither test by pinching withers to cause depression of back and eliciting grunt is effective diagnostic tool usually heared 2-3 seconds before primary ruminal contraction can be felt through the left flank (Radostits *et al*., 2007).

A B

Figure 2 : Wither pinch (A) and grunt test (B) in dairy cow (Boodur *et al*., 2010)

2.6.5. Ultrasonography and radiography

Ultrasonography of the ventral abdomen is the most accurate means of diagnosing localized peritonitis near the reticulum and characterizing the reticular contraction frequency. It rarely identifies the presence of a penetrating object. Ultrasonography of the heart and thorax is very useful in the diagnosis of pleuritis and pericarditis as sequelae to traumatic reticuloperitonitis. Ultrasonography provides more precise information about the contour of the reticulum and reticular motility (Radostits *et al*., 2007). In cattle ultrasonography can be used to identify morphological changes in region of cranial, ventral or caudal reticular wall. Radiography can help identity perforating foreign bodies in the reticular areas (Braun *et al*., 1998). Lateral radiographs of the cranioventral abdomen can detect metallic material in the reticulum but should only be taken after oral administration of a magnet (Boodur *et al*., 2010).

To determine whether the reticulum is currently perforated, the foreign body must be visible beyond the border of the reticulum, unattached to the magnet in the reticulum, or positioned off the floor of the reticulum. Portable radiographic units cannot penetrate the reticular area of standing adult cattle, and the cow may need to be transported to where there is equipment with sufficient power. The cow should not be placed in dorsal recumbency in order to obtain radiographs because such manipulation places stress on adhesions and may lead to a localized peritonitis becoming a diffuse peritonitis due to gravitational spread of infection. With the animal standing, horizontal beam is centered on the reticulo diaphramatic region in cranioventral or caudoventral (Tyagi and Singh, 2013) Radiography obtained allows the identification of radio paquebodies and gas/ fluid interfaces typical of an intra abdominal abscess. The drawback of this technique is that not all heavy sharp objects will have sufficient density to show on an x-ray (Boodur *et al*., 2010).

2.7. Treatment

Treatment of the typical case seen early in its course may be surgical or medical. Either approach improves the chances of recovery from 60% in untreated cases to 80–90%. Conservative treatment includes administration of diuretics to reduce edema, although of limited value, and appropriate antimicrobial therapy (Tyagi and Singh, 2013)

Antimicrobials should be administered perioperatively. Medical treatment involves administration of antimicrobials to control the peritonitis and a magnet to prevent recurrence. Because of the mixed bacterial flora in the lesion, a broad-spectrum antimicrobial agent such as oxy-tetracycline and penicillin is used widely and is effective in many cases despite its limited spectrum. Supportive therapy, such as oral or occasionally IV fluids and SC calcium borogluconate, should be administered as needed. Rumen inoculation is beneficial in some cases with prolonged ruminal stasis and loss of normal flora. For penetrating foreign boby conservative (medical) therapy comprises immunization of the animal by administration of antimicrobial for the inflammation for 3-5days (Radostits *et al*., 2007). A magnet administered orally falls into the cranial sac of the rumen, but normal ruminal contraction usually brings the magnet to the reticulum and foreign bodies still partially in the lumen of the reticulum that have injured the reticular wall are attracted to and fixed to the magnets, thus preventing their migration from continuing and most times returning the foreign body into the lumen of reticulum (Roman and Hiwot, 2010).

Surgery involves rumenotomy with manual removal of the object(s) from the reticulum; if an abscess is adhered to the reticulum, it should be aspirated and then drained into the reticulum. For non-penetrating foreign body emptying the rumen by rumenotomy is considered as rapid and quick method of relieving the problem of the animals (Ghurashi, 2009). Rumenotomy along with transplantation of fresh ruminal cud is the best technique for restoration of ruminal function at fluid level for ruminal impaction due to plastics in cattle and buffaloes (Boodur *et al*., 2010). More advanced cases, those with obvious secondary complications, or those that do not respond to initial medical or surgical therapy should be evaluated from an economic perspective; if the cattle are of limited value, slaughter should be considered if the carcass is likely to pass inspection (Turkar *et al*., 2010).

2.8. Prevention and control

Preventive measures include avoiding the use of baling wire, passing feed over magnets to remove any magnetic foreign bodies prior to being fed to cattle, keeping cattle away from sites of new construction, crop fields should be monitored for metal debris and completely removing old buildings and fences. Additionally, bar magnets may be administered per os, preferably after fasting for 18–24 hours (Tesfaye *et al*., 2012. Usually, the magnet remains in the reticulum and holds any ferromagnetic objects on its surface. There is good evidence that giving magnets to all herd replacement heifers and bulls at 1 year of age to minimize the incidence of traumatic reticulo-peritonitis (Ravindra *et al*., 2014).

2.9. Complication

The ingestion of foreign body is mainly related with nutritional deficiencies and feeding management and cause various problem in different organs of the animal, mainly in rumen and reticulum (Jones *et al.*, 1996). The problems that are caused vary with the duration that the foreign body has been present, the location of the foreign body, the degree of obstruction that is caused as well as problem associated with the material of the foreign body. Ingestion of non- dietary materials in mainly related to nutritive deficiency and feeding management of the animals causes various problems in different organs of the animals like glositis, esophagitis, ruminitis, impaction of rumen, traumatic pericarditis (TP) and traumatic reticulo-peritonitis (TRP) are the possible health problems

can be caused by the ingestion of foreign bodies in ruminants (Ravindra,. *et al* 2014). Among the numerous diseases of foreign body syndrome in ruminant species, traumatic reticulo peritonitis (TRP) and traumatic pericarditis (TP) are the most common problems in cattle. TRP is a sporadic disease in ruminants caused by perforation of the reticulum due to ingestion of foreign materials, which is a common cause of abdominal surgery in cattle (Boodur *et al*., 2010).

Traumatic reticuloperitonitis (TRP) in cattle is mainly caused due to the ingestion of sharp foreign bodies like nails, wires etc. The honeycomb like structure of the reticulum provides many sites for fixation of a foreign body, and contractions of the reticulum and pressure of the calf during late pregnancy may be sufficient to push a sharp foreign body through the wall, inducing the disease (Ghanem, 2010). In the TRP group we observed extensive fibrinous adhesions between the cranioventral aspects of the reticulum, the ventral abdominal wall, and thediaphragm. Adhesions and multiple abscesses were observed on either side of the reticulum (Ghurashi *et al*., 2009). Large quantities of turbid, foul-smelling peritoneal fluid that contained fibrinous clots were present (Ghanem, 2010; Boodur *et al*., 2010).

3. MATERIALS AND METHODS

3.1. Study area

The study was conducted from October, 2014 to April, 2015 at Bahir Dar municipal abattoir. Bahir Dar is the capital town of amhara national regional state, one of the leading tourist destinations in Ethiopia with a variety of attractions in the nearby Lake Tana and Blue Nile River. It is distinctly known for its wide avenues lined with palm trees and range of colorful flowers. The study area is located 578 km northwest of Addis Ababa, 11^{o}37'N latitude and 37^{o}25'E longitude with elevation of 1,840m above the sea level, annual rain fall of 1200-1600 mm and means annual temperature of 29.5°C (Bureau of agriculture, 2006).

The landscape is marked by the presence of Lake Tana, which drains a watershed of about 3,000km^2 and areas adjacent to Lake Tana and Abay river have poor drainage and annual over flooding during the rainy seasons leave pockets of water bodies, which persist during the dry months. The livelihood of the peoples is based on agriculture and 80% of the population practice mixed crop livestock farming system. The region has 10.6 million cattle, 5.7 million sheep, 4 million goats, 2.1 million equines and 17,400 camels managed under extensive and semi-intensive management system (Bureau of Agriculture, 2000). The current level of contribution of the livestock sector in Ethiopia is below the expected potential. Export of livestock and livestock by products have contributed to the economy of the country by providing foreign exchange earnings accounting about 15% and 40% of all export earnings and export from agriculture exports respectively (FAO, 1996). But this is much lower than would be expected, given the size of the livestock population in the country (Berhanu *et al*., 2007).

3.2. Study population

The study animals were apparently healthy cattle of different breed, age, place of origin, body condition score and sex that brought to Bahir Dar municipal abattoir from October, 2014 to April, 2015. Based on their body condition score the study animals were categorized in three groups as poor, medium and good (Nicolson and Butterowrth, 1986) (Annex 3) and animal's age also grouped as young (1 to 3 years), adult (4 to 7 years) and old (>7 years) (Annex 2) by using the owners information and dental eruption (Anwar *et al.*, 2013). Animals less than four years old were not

slaughtered in Bahir Dar municipal abattoir during the study period. The slaughtered cattle were local breed and unknown blood level Holstein Friesian cross breed. Animals presented in the abattoir were difficult to precisely indicate the geographical origin of all animals slaughtered, but most cattle were originated from Adet, Debretabor, Bahir Dar, Woreta and Estie. The animals were collected from different markets by small business enterprise organization and they change their management system from free grazing to semi-intensive system management system. The slaughtered animals were transport to the abattoir through its hoof.

3.3. Study design

Cross sectional study was conducted to determine the prevalence of indigestible rumen and reticulum foreign bodies in cattle slaughtered at Bahir Dar municipal abattoir by using both ante-mortem examination and post-mortem examination. Cattle presented for slaughters were identify by sex, breed, age, place of origin and body condition score prior to slaughter. Cattle age was determined both before and after slaughter through examination of tooth eruption. At postmortem, the abdominal cavities of animals were thoroughly examined by visual inspection and palpation. The rumen and reticulum were carefully removed from the abdominal cavity. Any foreign bodies obtained during inspection was washed with water to removing adhering ingesta then identified. When the finding is positive, the location and type of the foreign bodies were recorded in data recording sheet.

3.4. Sample size determination and Sampling methods

The total number of cattle required for the study is calculating based on the formula given by (Thrusfield, 2005). By rule of thumb where there is no information about the prevalence of the rumen and reticulum foreign body in slaughtered cattle in an area, it is possible to take 50% prevalence with 5% absolute precision. There for the sample size was calculated based on the following formula.

$$n= (1.96)^2 P_{exp} (1-P_{exp})/d^2$$

Where

n = required sample size

P_{exp} = expected prevalence

d = designed absolute precision (5%)

So the calculated sample size is 384 cattle.

The animals were selected by using systematic random sampling to study the prevalence of indigestible rumen and reticulum foreign bodies in cattle slaughtered at Bahir Dar municipal abattoir.

3.5. Study methodology

3.5.1. Ante mortem Examination

During ante mortem examination of the individual animals for assessment of sex, age, breed, body condition and their place of origin and each animal was marked for the identification by writing a code on its gluetal muscle by using unwashable ink.

3.5.2. Postmortem examination

During postmortem examination the abdominal cavities of animals were thoroughly examined by visual inspection and palpation. The rumen and reticulum were carefully removed from the abdominal cavity and incised. All the contents were thoroughly examined for the presence of any foreign bodies. When foreign bodies are encountered, they were removed, washed, and identified type of the foreign bodies were recorded.

3.6. Methods of data management and statistical analysis

Animals presented for slaughter were identified by a unique identification number and each animal was listed against breed, sex, age, body condition and type of foreign body with its site of organ (rumen and reticulum). The collected and recorded data on the paper were transferred to Micro Soft Excel spread sheet. Then it was analyzed by using SPSS 16.0. windows software and Chi-square (χ^2) test was applied to compare the foreign body prevalence with regard to the its risk factors like age, body condition scores, sex, breed and site of foreign body in animals. For all statistical analyses, a significant level (p value) of less than 0.05 was considered as statistically significant result.

4. RESULTS

The result of examined slaughtered cattle for the presences of any foreign bodies in their rumen and reticulum were discussed detail with its associated risk factors such as age (Table 3), sex (Table 4), body condition scores (Table 5), breed (Table 6) and stomach compartments (Table 7). The types of foreign bodies detected in this study were wire, nail, piece of iron, plastic, hair ball, leather, cloth and bone. In the present study the prevalence of plastics foreign body (51.1%) is higher followed by clothes (39.8%), robes (22.7%) and nail (19.5%) among the rest examined foreign body (Table 2).

4.1. Overall Prevalence

Out of the total 384 heads of cattle slaughtered at Bahir Dar municipal abattoir examined for the presences of any foreign bodies in their rumen and reticulum, 88 (22.9%) were positive (Table 1).

Table 1: Overall Prevalence Foreign bodies in cattle

Number of animals examined	**Total number of positive**	**Prevalence (%)**
384	88	22.9

Table 2: Prevalence of examined foreign body

				Foreign body						
	Clothes	Plastics	Robe	Nail	Wire	Piece of iron	Leather	Bone	Hair ball	Total
Number of Positive	35	45	20	17	9	4	8	6	1	88
Prevalence (%)	39.8	51.1	22.7	19.5	10.2	4.5	9.1	6.8	1.1	22.9

4.2. Foreign body prevalence in relation to age

The study animals were grouped into the age group of adult (4-7 years) and old (7^{+} years). In this study 162 adults and 222 old animals were examined for foreign body in their fore stomach. Among

these examined animals 22 (13.6%) adult and 66 (29.7%) old were positive for foreign body ingestion. There was significant difference ($p< 0.05$) between adult and old animals in the occurrence of foreign body in their fore-stomachs of rumen and reticulum. Type of foreign bodies encountered in the fore-stomach of animals between adult and old aged animals were more similar (Table 3).

Table 3: Type of foreign body's prevalence in relation with the age of the cattle

	Age		
Foreign body	4-7 years	>7 years	Total
No foreign body	140 (86.4%)	156 (70.3%)	296 (77.1%)
Wire	3 (1.9%)	3 (1.4%)	6 (1.6%)
Nail	3(1.9%)	1 (0.5%)	4 (1.0%)
Piece of iron	0(0%)	4 (1.8%)	4 (1.0%)
Clothes	0(0%)	4 (1.8%)	4 (1.0%)
Plastic	1 (0.6%)	5 (2.3%)	6 (1.6%)
Robe	3 (1.9%)	4 (1.8%)	7 (1.8%)
Leather	1 (0.6%)	3 (1.4%)	4 (1.0%)
Hair ball	0 (0%)	1 (0.5%)	1 (0.3%)
Bone	0 (0.0%)	5 (2.9%)	5 (1.3%)
Nail and wire	2 (1.2%0	1 (0.5%0	3(0.8%)
Cloth and plastic	4 (2.5%)	9 (4.1%)	13 (3.4%)
Cloth and hair	1 (0.6%)	4 (1.8%)	5 (1.3%)
Plastic and robe	1 (0.6%0	8 (3.6%0	9 (2.3%)
Robe, leather and plastic	1 (0.6%0	3 (1.4%)	4 (1.0%)
Plastic, bone and cloth	1 (0.6%)	2 (0.9%)	3 (0.8%)
Clothes, plastic and nail	1 (0.6%)	9 (4.1%)	10 (2.6%)
Total positive	22 (13.6%)	66(29.7%)	88 (22.9%)

$\chi^2=28.223$, $P=0.030$

4.3. Foreign body prevalence in relation to sex

During this study 336 male and 48 female animals were examined and among these examined animals foreign bodies were observed at the maximum of 6 (24.4%) in female compared to male 82 (12.5%). There was no significant difference ($p > 0.05$) between sex of slaughtered cattle and foreign body prevalence in rumen and reticulum (Table 4).

Table 4: Type of foreign bodies prevalence in relation to sex the cattle

	Sex		
Foreign body	Female	Male	Total
No foreign body	42 (87.5%)	254 (75.6%)	296 (77.1%)
Wire	0 (0.0%)	6 (1.8%)	6 (1.6%)
Nail	0 (0.0%)	4 (1.2%)	4 (1.0%0
Piece of iron	0 (0.0%)	4 (1.2%)	4 (1.0%)
Clothes	0 (0.0%)	4 (1.2%)	4 (1.0%)
Plastic	0 (0.0%)	6 (1.8%0	6 (1.6%)
Robe	1 (2.1%)	6 (1.8%)	7 (1.8%)
Leather	0 (0.0%)	4 (1.2%)	4 91.0%)
Hair ball	0 (.0%)	1 (0.3%)	1 (0.3%)
Bone	1 (2.1%)	4 (1.2%)	5 (1.3%)
Nail and wire	0 (0.0%)	3 (0.9%)	3 (0.8%)
Cloth and plastic	1 (2.1%)	12 (3.6%)	13 (3.4%)
Cloth and hair	0 (0.0%)	5 (1.5%)	5 (1.3%)
Plastic and robe	1 (2.1%)	8 (2.4%)	9 (2.3%)
Robe, leather and plastic	1 (2.1%)	3(0.9%)	4 (1.0%)
Plastic, bone and cloth	0 (.0%)	1 (0.3%)	1 (0.3%)
Clothes, plastic and nail	1 (1.2%)	3 (0.9%)	3 (0.8%)
Total positive	6(12.5%0	82 (24.4%)	88 (22.9%)

$\chi^2 = 7.683$, $P = 0.958$

4.4. Foreign body prevalence in relation to body condition

Most of the animals brought to abattoir to be slaughtered were comprised good, medium and poor body condition score. 124, 181 and 79 slaughtered cattle were examined for the presences of any foreign bodies in their rumen and reticulum with poor, medium and good body conditions scores respectively. From these examined animal 36 (29.0%), 40 (22.1%), and 12 (15.2%) were positive for foreign body, in their rumen and reticulum respectively. There was no significant difference ($p > 0.05$) between different body condition scores and foreign body prevalence in rumen and reticulum. Cloth, plastic, nail, robe and leather were more frequently encountered in poor body condition cattle, while in medium and good body condition of the cattle were found to have wire, nail and plastics, and plastic and robe foreign bodies in their fore-stomach respectively (Table 5).

Table 5: Type of foreign body's prevalence in relation with body condition of the cattle.

	Body Condition Score			
Foreign body	Poor	Medium	Good	Total
No foreign body	88 (71.0%)	141 (77.9%)	67 (84.8%)	296 (77.1%)
Wire	2 (1.6%)	4 (2.2%)	0 (0.0%)	6 (1.6%)
Nail	1 (0.8%)	3 (1.7%)	0 (0.0%)	4 (1.0%)
Piece of iron	2 (1.6%)	2 (1.1%)	0 (0.0%)	4 (1.0%)
Clothes	2 (1.6%)	2 (1.1%)	0 (0.0%)	4 (1.0%)
Plastic	3 (2.4%)	3 (1.7%)	0 (0.0%)	6 (1.6%)
Robe	2 (1.6%)	3 (1.7%0	2 (2.5%)	7(1.8%)
Leather	2 (1.6%)	1 (0.6%)	1 (1.3%)	4 (1.0%)
Hair ball	0 (0.0%)	0 (0.0%)	1 (1.3%)	1 (0.3%)
Bone	0 (0.0%)	3 (1.7%)	2 (2.5%)	5 (1.3%)
Nail and wire	2 (1.6%)	1 (0.6%)	0 (0.0%)	3 (0.8%)
Cloth and plastic	3 (2.4%)	7 (3.9%)	3 (3.8%)	13 (3.4%)
Cloth and hair	3 (2.4%)	1 (0.6%)	1 (1.3%)	5 (1.3%)
Plastic and robe	3 (2.4%)	4 (2.2%0	2 (2.5%)	9 (2.3%)
Robe, leather and plastic	3 (2.4%)	1 (0.6%)	0 (0.0%)	4 (1.0%)
Plastic, bone and cloth	1 (0.8%)	2 (1.1%)	0 (0.0%)	3 (0.8%)
Clothes, plastic and nail	7 (5.6%)	3 (1.7%)	0 (0.0%)	10 (2.6%)
Total positive	36 (29.0%)	40 (22.1%)	12 (15.2%)	88 (22.9%)

χ^2=32.232, P=0.455

4.5. Foreign body prevalence in relation to breed

To study any foreign bodies in their rumen and reticulum 373 were local breeds and 11 were cross breed of Holstein Frisian and local breeds were examined. In this study 83 local breed and 5 cross breeds were positive for foreign body in their fore stomach. Foreign bodies were observed at the maximum of 46.5 % in cross cattle breeds compared to local breeds 22.3% from the overall

prevalence of foreign bodies in cattle 22.9%. There was significant difference ($p< 0.05$) between breeds of slaughtered cattle and foreign body prevalence in rumen and reticulum (Table 6).

Table 6: Type of foreign body's prevalence in relation with the breeds of the cattle.

	Breed		
Foreign body	Local	Cross	Total
No foreign body	290 (77.7%)	6 (54.5%)	296 (77.1%)
Wire	6 (1.6%)	0 (0.0%)	6 (1.6%)
Nail	4 (1.1%)	0 (0.0%)	4 (1.0%)
Piece of iron	3 (0.8%)	1 (9.1%)	4 (1.0%)
Clothes	4 (1.1%)	0 (0.0%)	4 (1.0%)
Plastic	6 (1.6%)	0 (0.0%)	6 (1.6%)
Robe	7 (1.9%)	0 (0.0%)	7 (1.8%)
Leather	4 (1.1%)	0 (0.0%)	4 (1.0%)
Hair ball	1 (0.3%)	0 (0.0%)	1 (0.3%)
Bone	5 (1.3%)	0 (0.0%)	5 (1.3%)
Nail and wire	3 (0.8%)	0 (0.0%)	3 (0.8%)
Cloth and plastic	10 (2.7%)	3 (27.3%)	13 (3.4%)
Cloth and hair	5 (1.3%)	0 (0.0%)	5 (1.3%)
Plastic and robe	9 (2.4%)	0 (0.0%)	9 (2.3%)
Robe, leather and plastic	3 (0.8%)	1 (9.1%)	4 (1.0%)
Plastic, bone and cloth	3 (0.8%)	0 (0.0%)	3 (0.8%)
Clothes, plastic and nail	10 (2.7%0)	0 (0.0%0	10 (2.6%)
Total positive	83 (22.3%0	5 (46.5%)	88 (22.9%)

$\chi^2 = 35.896, P = 0.003$

4.6. Prevalence of foreign body in relation to the stomach compartment

From 88 positive cases of foreign body 57 (64.77%) were occurred in rumen, 21 (23.86%) in reticulum and 10 (11.36%) in rumen and reticulum from the overall prevalence of foreign bodies in cattle (22.9%). There was a significant difference ($p< 0.05$) between the stomach compartment and foreign body prevalence in rumen and reticulum (Table 7).

Table 7: Type of foreign body's prevalence in relation with the stomach compartment of the cattle

Foreign body	Rumen	Reticulum	Rumen and reticulum	Total
No foreign body	317	353	296	296
Wire	0 (0.0%)	6 (28.6%)	0 (0.0%)	6 (1.6%)
Nail	0 (0.0%0	4 (19.0%0	0 (0.0%)	4 (1.0%)
Piece of iron	0 (0.0%0	4 (19.0%0	0 (0.0%)	4 (1.0%)
Clothes	4 (7.0%)	0 (0.0%)	0 (0.0%0	4 (1.0%)
Plastic	6 (10.5%)	0 (0.0%)	0 (0.0%)	6 (1.6%)
Robe	6 (10.5%)	1 (4.8%)	0 (0.0%)	7 (1.8%)
Leather	4 (7.0%)	0 (0.0%)	0 (0.0%0	4 (1.0%)
Hair ball	1 (1.8%)	0 (0.0%)	0 (0.0%	1 (0.3%)
Bone	3 (5.3%)	2 (9.5%)	0 (0.0%)	5 (1.3%)
Nail and wire	0 (0.0%)	3 (14.3%)	0 (0.0%)	3 (0.8%)
Cloth and plastic	13 (22.8%)	0 (0.0%)	0 (0.0%)	13 (3.4%)
Cloth and hair	5 (8.8%)	0 (0.0%)	0 (0.0%)	5 (1.3%)
Plastic and robe	8 (14.0%)	0 (0.0%	1 (10.0%)	9 (2.3%)
Robe, leather and plastic	4 (7.0%)	0 (0.0%)	0 (0.0%0	4 (1.0%)
Plastic, bone and cloth	2 (3.5%)	0 (0.0%)	1(10.0%)	3 (0.8%)
Clothes, plastic and nail	1 (1.8%)	1 (4.8%)	8 (80.0%)	10 (2.6%)
Total	57(64.77%)	21(23.86%)	10(10.36%)	88(22.9%)

χ^2=9.464, P=0.000

5. DISCUSSION

Prevalence of foreign body ingestion such as cloth, plastic, hair ball, robe, leather, wire, nail and other indigestible materials found in ruminants could poses serious health problem among free grazing animals (Abebe and Nuru, 2011). This study revealed an overall prevalence of indigestible rumen and reticulum foreign bodies prevalence of 22.9% (n=88) in cattle slaughtered at Bahir Dar municipal abattoir.

The present prevalence rate of foreign bodies is in agreement with the finding of Dawit (2012) 23.9% but higher than the report of Rahel (2011) 17.07% and Desiye and Mersha (2012) 13.22% of prevalence of fore stomach foreign bodies in Hawasa and Jimma municipal abattoir, Ethiopia respectively. The difference in the prevalence rate may be due to the feeding system in which the animals were kept. Feed shortage usually occurs at specific time of the year in most part of Ethiopia. It has been reported that ingestion of foreign bodies is associated with shortage of forage and increased pollution of grazing land with indigestible foreign bodies (Hailat *et al*., 1996). Moreover, most owners do not provide supplementary feed to animals. These in turn may predispose the animals to negative energy balance and force them to feed on unusual materials including plastics, clothes, ropes and even metallic substances (Hailat et al., 1996).). Wide spread use and improper disposal of plastics that are used for packing of goods could also contribute for the occurrence of foreign bodies in the rumen and reticulum (Tesfaye *et al*., 2012). Lack of awareness among livestock owners on the risk of ingestion of these foreign materials by animals may also contributed for the occurrence of foreign bodies in the rumen and reticulum (Remi *et al*., 2004)

Higher prevalence was reported by Ismael *et al*. (2007) 77.41% of adult dairy cattle in Jordan and Anwar *et al*. (2013) 59.14% in achai cattle at different regions of Khyber Pakhtunkhwa. The variation in the prevalence rate may be due to differences in the origin of animals presented for slaughter, waste management system of the countries and the drought condition in the study year. Moreover, the time of the study also could play a role for the differences where in recent times the rate of intensification of animal management is increasing and as a result the probability of animals to be exposed to foreign materials might be declined as the animals are staying in a limited confinement for longer time (Hailat *et al*., 1997; Dawit, 2012).

The types of foreign bodies detected in this study were wire, nail, piece of iron, plastic, hair ball, leather, cloth and bone. Hailat *et al*. (1997) also found plastic bags, nails, hair balls, ropes and leather occurring as indigestible foreign bodies. In the present study the prevalence of plastics foreign body (51.1%) is higher followed by clothes (39.8%), robes (22.7%) and nail (19.5%) among the rest examined foreign body (Table 2). This study is agreement with the finding of Hailat *et al*. (1996) 74%, Igbokwe *et al*. (2003) 81.6%, Remi *et al*. (2004) 85%, Roman and Hiwot (2010), Abebe and Nuru (2011) 59.6% and Tesfaye *et al*. (2012) 71.7%. This similarity may be due to the environment polluted by the same type of waste materials used for storing wastes, shopping bags and packing food items and disposed everywhere after using, hence they were eaten by the free grazing animals. But this study was disagreement with the finding of Ducharme and Fubini (2004). According to Ducharme and Fubini (2004) they have reported that wires account for approximately 70% of ingested foreign bodies and nails and other objects make up the other 30%. The difference in the prevalence rate might be due to differences in the origin of animals presented for slaughter and type of waste management system between the countries (Hewot, 2008)

The present study indicates that all metallic foreign bodies were occurred in the reticulum of slaughtered cattle. Radostits *et al*. (2007) reported that in industrialized countries, metallic foreign bodies present in the reticulum up to 90% of animals but the metallic foreign bodies ingestion was more in war hit areas. The reason might be due to retention of these foreign bodies by the honey comb structure of the reticular mucosa and their heavy weight give chance to be attracted to the lumen of the reticulum due to gravitational attraction force of these heavy foreign bodies to the ventral part of the fore stomach (Hailat *et al*., 1996; Igbokwe *et al*., 2003; Remi *et al.*, 2004)

In this study there was no significant ($P>0.05$) difference between sex, however, the prevalence of foreign body in female (24.4%) is higher as compared to male animals (12.5%) slaughtered in abattoir. This result was in agreement with the findings of Desiye and Mersha (2012) 10.34% and 80% were detected in male and female animals, respectively at Jimma municipal abattoir. According to Anwar *et al*. (2013) study foreign bodies were observed at the maximum of 65.8% in female Achai cattle compared to male 37.03% in different regions of Khyber Pakhtunkhwa. Similarly Vanitha *et al*. (2010) reported that the foreign bodies were found more frequently in female cattle than male in their study on 30 stray cattle having clinical symptoms suggestive of ruminal impaction. Igbokwe *et al*. (2003), Roman and Hiwot (2010) and Zegeye (2011) have also reported

that higher degree of occurrence of foreign bodies in female animals compared to male animals. This may be associated with increased appetite of female animals due to the nutritional demands during pregnancy, lactation and female animals are kept longer than the males for breeding and male calves culled soon after calving for saving of feeds, hence predisposition could be more than that of the male animals. Dairy cattle are more likely to feed a chopped feed, such as silage or hay (Igbokwe *et al*., 2003; Anwar *et al*., 2013)

In this study the prevalence of foreign body higher in the cross breeds cattle (45.5%) than local breeds (12.3%). These results were in agreement with the findings of Desiye and Mersha (2012) 70% in cross breeds and10.77% local breeds and Sileshi *et al*. (2013) 71.43% in cross breeds and 37.76% local breeds who reported the prevalence of foreign body in cattle slaughtered in Jimma and in Gondar town. This might be associated with the level of milk yield which requires high demand of nutrition, voracious feeder and optimal daily intake of feed than local breeds, hence increase exposure for foreign bodies.

The highest prevalence of rumen and reticulum foreign bodies were detected in old cattle greater than 7 years old 29.7% as compare to below 7 years old 13.6% slaughter in Bahir Dar abattoir. Similar findings were reported by Desiye and Mersha (2012) 10.53%, 12.81%, and 80% within the aged group of <5, 5-10 and >10 years in cattle slaughtered at Jimma municipal abattoir. Similarly Tesfaye *et al*. (2012) reported that the foreign bodies were found more frequently in aged animals with 33.4% prevalence in their study on rumenal and reticular foreign bodies in small ruminants slaughtered at Jimma municipal abattoir. Ismael *et al*. (2007), Abebe and Nuru (2011) and Sileshi *et al* (2013) have also reported that higher degree of occurrence of foreign bodies in old animals compared to young animals. The finding of more foreign bodies in older animals than the young ones may be due to the gradual ingestion of indigestible materials over the prolonged period of time and gradual accumulation of these types of foreign bodies in the rumen (Dawit *et al*., 2012; Desiye and Mersha, 2012; Anwar *et al*., 2013).

In the present study there was no significant (P>0.05) difference between body condition, however prevalence of foreign body is higher in poor body condition 29% as compare to medium 22.1% and good body condition score 15.2%. According to Roman and Hiwet (2010) study on occurrence of rumen foreign bodies in sheep and goats slaughtered at the Addis Ababa municipality abattoir

emaciated and thin animals have higher prevalence 38.2% among average (43.6%), fat (16.8%) and obese 10 (1.4%).This study is also agreement with the finding of Remi *et al*. (2004), Ismael *et al*. (2007), Rahel (2011) and (Anwar *et al*. (2013)) reported a higher prevalence in animal having poor body condition. Poor body condition by itself might be due to the contribution of the foreign body that is the animal loss weight after it has been exposed to indigestible materials (Remi *et al*., 2004; Roman and Hiwet 2010). Competition of feed among the animals living in a larger herd in captivity leads to insufficient feeding to weak animals thus forcing them to eat foreign materials to satisfy their appetite (Kuma and Dhar, 2013).

In this study 64.77% and 23.86% of foreign bodies occurred only in the rumen and reticulum respectively, while 11.36% of foreign bodies occurred in both rumen and reticulum slaughtered at Bahir Dar municipal abattoir. This study indicates that the highest prevalence of occurrence foreign bodies was detected in rumen as compare to reticulum. This study is agreement with the finding of Tesfaye *et al*. (2012) in the rumen (79.2%) than reticulum (20.8%) and Abebe and Nuru (2011) 87.2 % in rumen and 12.8% in reticulum of small ruminants slaughtered at Luna export abattoir. Similarly Hewot (2008) also have reported higher prevalence of foreign bodies in the rumen than in the reticulum. This may be due to that the larger size of rumen as compared to that of reticulum and many ingested feed goes to the rumen and most foreign bodies have low specific gravity.

6. CONCLUSION AND RECOMMENDATION

Foreign body syndrome is becoming a problem to livestock owners and farmers of our country greatly attributed to heavy industrialization and human habitation which has increase the chance of livestock to ingest such objects. Ingestion of indigestible materials may occur during period of food scarcity. Rumen and reticulum foreign bodies can significantly affect the digestion process by occupying space and blocking ingesta movement which ultimately impair the health and productivity of animals. Indigestible foreign bodies materials could pose serious health problem for free grazing ruminants unless appropriate measure is taken. Cross breed cattle are the most affected groups compared to that of local breed cattle. Hence, sex, breed, age and body condition score of animals are the considered risk factors for the occurrence of foreign bodies. Based on the above conclusions the following points are recommended.

- Awareness may be created on careless disposal of plastic bags, rope and leather and as well as the periodical cleaning of these wastes in the grazing area.
- Strict legislations regarding the proper disposal of wastes from households and factories should be applied to reduce pollution of the environment.
- Veterinarians and animal health workers should considered foreign bodies as one of the differential diagnosis for gastro-intestinal disorders.
- Modern diagnostic techniques have greatly enhanced the capabilities of veterinarians to diagnose such conditions, further enhancement and sophistication is needed as the prognosis of treatment and survival relies on early diagnosis of such conditions.
- Dispose of the vegetable waste/ kitchen waste in plastic bags, sensitizing the livestock owners of accidental ingestion of plastic material in grazing area (highway road, town, cities, semi-urban area etc.).
- Keeping cattle away from the site of new construction and keeping away from old and unclear grazing sites, animal owners should be advised to keep their cattle in intensified manner so that the owners could easily control their accessibility to foreign bodies.

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8. ANNEXES

Annex1. Data collection and result recording format

Sn.No.	**Ante-mortem examination**				**Post-mortom examination**		
1	Breed	Sex	Age	BCS	Rumen	Reticulem	Age
2							
3							

Annex 2. Age determination based on dental characteristics/formula

Age in years	**Characteristic of tooth**
2	The first permanent incisors come in from about the time a cow is 1 1/2 years old to two years. By approximately age two years they are typically fully developed. They often come in at an angle and then straighten. Smaller teeth visible to the left and right of the first permanent incisors are "milk" or "baby" teeth
3	The second pair of permanent incisors appear somewhere around age 2 1/2 years, and are typically fully developed by age three years.
4	At approximately age 3 1/2 years the third pair of permanent incisors are cut and are typically fully developed by age four years.
5	At approximately age 4 1/2 years the last of the cow's permanent incisor teeth (the "corner" incisors are cut, and are typically fully developed by age five years. Therefore, at age five years, cows typically have all eight of their permanent incisors erupted and in use. At this age the incisors are tall, relatively flat across the front (when compared to older ages), sharp at the top, and close together.

6	From age six forward, estimating cattle age by their teeth is based on the degree of wear of the teeth. Estimating the age of cattle from this point forward becomes more difficult. At age six years the cow's eight permanent incisor teeth will begin to show various degrees of wear. The tops of the teeth will still be comparatively sharp but will have begun to dull slightly, and the teeth will begin to take on a slightly rounded appearance from side-to-side (as opposed to appearing more flat from side-to-side as seen in younger ages). At age six the tops of teeth typically still touch, but subtle separations toward the bottom, between at least some of the teeth, may begin to appear. Commonly, little if any of the roots will be visible at the gum line.
7	At age seven years the cow's eight permanent incisor teeth will continue to show various degrees of wear. The tops of the teeth will show additional loss of sharpness, and the teeth will continue to appear slightly more rounded from side-to-side (as opposed to appearing more flat from side-to-side as seen in younger ages). At age seven there is commonly a separation, from subtle to definitely noticeable, between at least some of the teeth from top to bottom. The roots of the teeth may begin to be visible at the gum line.
Solid age>7	Solid" can mean there is no tooth loss, and/or it can mean that there are not any wide gaps between the teeth. The teeth will be shorter, and the tops will be smoother and less sharp. The teeth will continue to show additional rounding from side-to-side, and there is likely to be roots noticeable in the gum line.
Short age(>10)	In short aged cattle very short teeth with large gaps between most or all of them, often particularly at the bottom. Roots may be quite visible.
Broken Mouth	The age "broken mouth" is older than the age "short." Commonly, a broken mouth cow is a cow that has lost one tooth due to age. In some areas, a cow is not a "broken mouth" until she has lost two teeth due to age.

Gummer	A "gummer" is often the oldest age description given to a cow. A gummer has lost several teeth due to age, or has worn them down until they are of little or no practical use.

Source: (Johnson, 2003; Anwar *et al*., 2013)

Annex 3. Body condition scoring

Poor Body condition	
score1	Emaciated; starving and weak; the entire body is extremely thin, and all skeletal structures are prominently visible. No muscle tissue is evident and no external fat is present. All the skeletal structures are visible and very sharp to the touch. The hair coat appears to be very dull. Survival during stress is doubtful
Score 1.5	Very thin, somewhat emaciated; The vertebrae along the top line are prominent. The hooks and tail head are visually less prominent. There is no fat around the hip bone and pin bone and tail head
score2	The animal is thin. The vertebrae along the top line are prominent. Muscle tissue is evident, but not abundant. Individual vertebrae can be felt, but are not as sharp. The short ribs can be identified individually when touched, but they feel sharp rather than very sharp. Individual ribs can be identified visually. There is some tissue cover around the hook and tail head.
Medium Body Condition	
score2.5 4	Individual ribs noticeable but overall fat cover is lacking; increased musculature through shoulders and hindquarters; hips and short ribs feel slightly round versus sharp.
Score 3	3 Increased fat cover over ribs, and ribcage is only slightly visible. Muscle tissue is nearing the maximum. Generally only the 12 and 13 ribs are individually

	distinguishable. There are obvious fat deposits behind the front shoulder. Areas on each side of the tail head are fairly well filled but not rounded
Score 3.5	Back, ribs, and tail head slightly rounded and feel spongy when palpated
Good body condition	
Score 4	Moderately fat the bone structure is no longer noticeable. The skeletal structure is difficult to identify. Individual short ribs cannot be felt even with firm pressure. Folds of fat are beginning to develop over the ribs and thurl area of the animal. Fat cover around the tail head is evident on both sides as slight "rounds" that are soft to the touch.
Score 4.5	Fat; very fleshy, squared appearance due to excess fat over back, tail head, and hindquarters. Individual short ribs cannot be felt even with firm pressure. Mobility may begin to be restricted
Score 5	Very fat or obese - The animal has a "blocky" appearance. The bone structure is not noticeable. The back bone has a flat appearance and cannot be felt even with pressure. Folds of fat are apparent over the ribs, thurl and thighs. The hip bones and tail head to pin area on both sides are completely buried in fat. The animal's mobility is impaired by the large amounts of fat

Source: (Ferguson, 2011; Nicolson and Butterowrth, 1986)

9. DECLARATION

I, the under signed, declare that the information presented here in my thesis is my original work, has not been presented for degree in any other University and that all sources of materials used for the thesis have been dully acknowledge.

Name: Dessie Nebebe

Signature: _____

Date of submission: June 12, 2015

This thesis has been submitted for examination with my approval as University Advisor

Name: Dr. Abebe Tesfaye:

Signature: _____